CLAIMS

1. A network connection apparatus for operating a plurality of network connection apparatuses connected to a local area network virtually as one network connection apparatus, the network connection apparatus comprising:

a state monitor section for managing an operating state as a network connection apparatus;

a message processing section for performing an exchange process of an advertisement message representative of the operating state during operation as a network connection apparatus;

a priority comparing section for acquiring priority information representative of a priority to operate as a network connection apparatus from the advertisement message received, and comparing same with priority information possessed; and

a master transition timer section for counting for a timing of transition of from a standby state into an operating state as a network connection apparatus;

whereby, when the state monitor section decides not in an operating state, the priority comparing section commences a process for arbitration between the network connection apparatuses in standby state to transit to an operating state by use of the master transition timer at a time deciding that the priority possessed is higher than the priority information of within the advertisement message received.

2. A network connection apparatus for operating a

plurality of network connection apparatuses connected to a local area network virtually as one network connection apparatus, the network connection apparatus comprising:

a state monitor section for managing an operating state as a network connection apparatus;

a message processing section for performing an exchange process of an advertisement message representative of the operating state during operation as a network connection apparatus;

an advertisement timer for counting for a timing to send the advertisement message at a regular interval;

a message timer section for counting a time to decide whether the advertisement message is received in a predetermined time from the network connection apparatus operating as a network connection apparatus; and

a priority comparing section for acquiring priority information representative of a priority to operate as a network connection apparatus from the advertisement message received, and comparing same with priority information possessed; and

a master transition timer section for counting for a timing of transition of from a standby state into an operating state as a network connection apparatus;

whereby, when the state monitor section decides not in an operating state, the priority comparing section in a case of decision the priority possessed is higher than the priority information in the received advertisement message compares

between a remaining time of the message timer section and a skew time calculated based on the priority possessed, to set the skew time to the master transition timer section when the skew time is shorter, so that, when the master transition timer section goes into a time-up, the state monitor section instructs the message processing section to send an advertisement message requesting for transition of from operating state into standby state to the network connection apparatus operating as a network connection apparatus.

3. A network connection apparatus according to any one of claim 1 and 2, further comprising a link monitor section for evaluating a connectability with an external network, wherein in a case the link monitor section decides the connectability as a predefined value or higher when the master transition timer section goes into a time-up, the state monitor section sends an advertisement message instructing for transition from operating state into standby state to the network connection apparatus operating as a network connection apparatus.

4. A network connection apparatus according to any one of claim 1 and 2, further comprising a link monitor section for evaluating a connectability with an external network, wherein in a case the state monitor section decides operating as a network connection apparatus and the link monitor section decides the connectability lower than a predefined value, the state monitor section instructs the message processing section

to send an advertisement message representative of an operating state as a network connection apparatus to the network connection apparatus on a same local area network.

5. A network connection apparatus according to any one of claim 1 and 2, further comprising a link monitor section for evaluating a connectability with an external network, wherein in a case the state monitor section decides operating as a network connection apparatus and the link monitor section decides the connectability lower than a predefined value, the state monitor section instructs the message processing section to send an advertisement message requesting for a transition from standby state into operating state to the network connection apparatus on a same local area network.

6. A network connection apparatus according to any of claims 1 to 3, wherein the transition request from operating state into standby state by the state monitor section is the advertisement message set with a possessed priority at a highest, and the master transition timer section is set with a skew time based on the priority set.

7. A network connection apparatus according to claim 4, wherein the advertisement message representative of the operating state, in a case the state monitor section decides operating as a network connection apparatus and the link monitor section decides the connectability lower than a predefined value, is set with a priority at a lowest.

8. A network connection switching method comprising:

a state monitoring step of deciding whether a plurality of network connection apparatuses connected to a local area network are in operating state or in standby state as a network connection apparatus to operate virtually as one network connection apparatus;

a step of receiving an advertisement message from a second network connection apparatus in operating state as a network connection apparatus by a first network connection apparatus decided as standby state in the decision; and

a priority comparing step of comparing between priority information, in the advertisement message, representative of a priority to operate as a network connection apparatus and priority information possessed;

whereby an arbitration process is commenced at between the network connection apparatuses in standby state to transit to operating state at a time that the priority possessed is decided higher in the priority comparing step.

9. A network connection switching method comprising:

a state monitoring step of deciding whether a plurality of network connection apparatuses connected to a local area network are in operating state or in standby state as a network connection apparatus to operate virtually as one network connection apparatus;

a step of receiving an advertisement message from a second operating network connection apparatus in operating step as a network connection apparatus by a first network connection

apparatus decided as standby state in the decision;

a step of counting a master down time for a decision as to whether the advertisement message is to be received in a predetermined time from the second network apparatus;

a step of notifying of a transition to operating state from the first network apparatus to the second network apparatus when the master down time expires;

a priority comparing step of comparing between priority information, in the advertisement message, representative of a priority to operate as a network connection apparatus and priority information possessed; and

a step of comparing between a remaining time of the master down time and a skew time calculated shorter in time as the priority possessed is higher when the priority possessed is higher in the priority comparing step, and replacing the master down time with the skew time when the skew time is shorter.

10. A network connection switching method according to claim 9, further comprising a step of detecting whether a connectability with an external network is equal to or greater than a predefined value or not, and a step of permitting the notification, of a transition to operating state, from the first network apparatus to the second network apparatus only when the connectability is equal to or greater than the predefined value in the detection at the first network connection apparatus.

11. A network connection switching method according to claim 10, further comprising a transition request step for the

second network connection apparatus to request the first network connection apparatus to transit to operating state when the connectability of the second network connection apparatus is not equal to or greater than the predefined value.

12. A network connection switching method according to any one of claim 9 and 10, further comprising a step of temporarily setting the priority possessed at a highest when the priority possessed is higher in the priority comparing step at the first network connection apparatus,

to notify the priority information possessed from the first network connection apparatus to the second network connection apparatus and other standby network connection apparatus in the step of a notification of transition to operating state.

13. A network connection switching method according to claim 11, wherein, in the transition request step, the second network connection apparatus makes a notification with the priority possessed rendered a lowest.

14. A network connection switching method according to claim 12, wherein the priority possessed is returned to a value immediately preceding to a setting at a highest after a transition of the first network connection apparatus from standby state into operating state.

15. A network connection switching method according to claim 11, further comprising a step of replacing the master down time with the skew time at a time that the first network

connection apparatus receives the transition request from the second network connection apparatus.